CHAPTER 7 - ENVIRONMENTAL OVERVIEW

OVERVIEW

This chapter presents an overview of the environmental conditions on and immediately surrounding the Groton-New London Airport (GON) and highlights the potential impacts associated with the recommended airport development plan which is the Minimum Build Alternative, as described below and depicted in Figure 7.1 entitled "Preferred Terminal Area Alternative". This was previously discussed in the Alternatives Chapter (see Table 5.5, Preferred Alternatives, page 133). The environmental information presented herein is adequate to satisfy the requirements of the Federal Aviation Administration's (FAA) Airport Master Plan Update (AMPU) process. However, it does not meet the level of detail and coordination that is required under the provisions of the National Environmental Policy Act of 1969 (NEPA). At the time of project implementation, an appropriate level of environmental analysis to satisfy NEPA will be completed. That documentation effort would update and build upon the information presented herein, and would involve detailed coordination with federal, state, and local environmental agencies. By addressing agency concerns, necessary approvals and permits can be effectively secured for the proposed development, thereby allowing project construction to proceed.

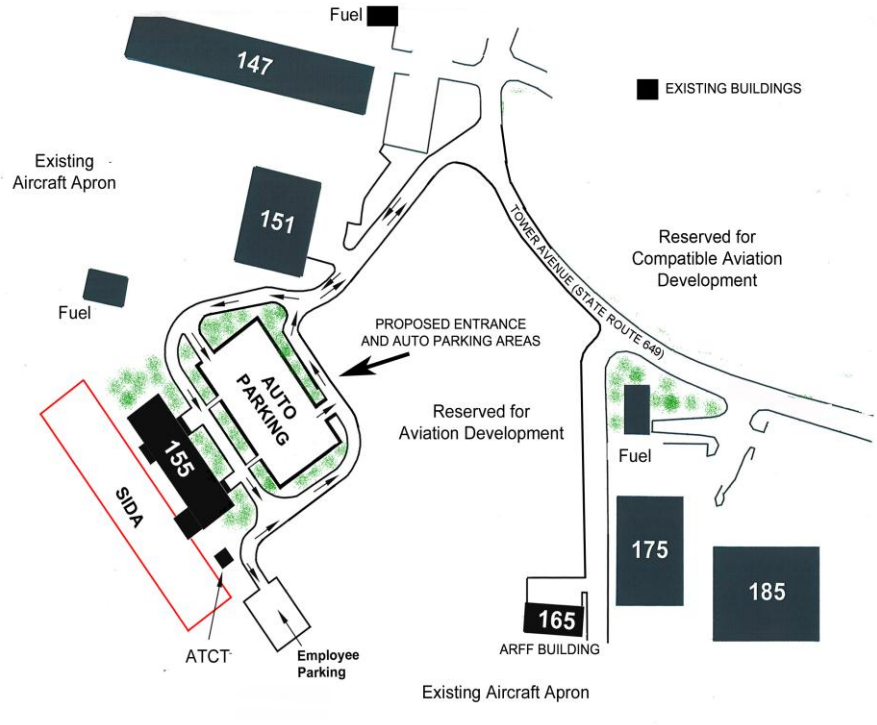


Figure 7.1 - Preferred Terminal Area Layout

RECOMMENDED ALTERNATIVE

The Minimum Build Alternative is the recommended alternative in the AMPU. This alternative involves reserving an area to the northeast of the existing surface parking lot and terminal building for "as yet to be defined" aviation development and reserving a

second area north-northwest of Tower Avenue for "as yet to be defined" compatible aviation development. The alternative assumes that there may be future demand for additional hangar and/or other related aviation business development that will exceed areas currently in use or under lease, but not to the point where a full airport build out is required. It allows for minimum development in the existing central terminal area. The location, size, and orientation of potential new buildings, automobile parking, entrance roads and other infrastructure most likely will be developed and based on actual demand, developer wishes, and lease negotiations in the future. Therefore, the focus of the Minimum Build Alternative impact assessment contained herein is on the two land areas reserved for development. It is important to note that an assessment of potential permits that may be required for development in these areas is speculative at best at this planning stage. As development concepts emerge, the nature and extent of permit requirements will become increasingly more evident.

RESOURCE OVERVIEW AND IMPACT ASSESSMENT

This overview and impact assessment of the recommended alternative was prepared following the guidelines of FAA Order 5050.4B, "*National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects,"* which requires, with one exception, a review of each of the following categories:

- Air Quality
- Coastal Barriers
- Coastal Zone
- Compatible Land Use
- Construction Impacts
- Aircraft Noise
- Social and Induced Socioeconomic Impacts
- Water Quality
- USDOT Section 4(f)
- Cultural Resources
- Biotic Communities
- Threatened and Endangered Species
- Secondary and Cumulative Impacts
- Light Emissions
- Natural Resources & Energy Supply
- Farmland
- Wetlands
- Floodplains
- Solid Waste
- Wild and Scenic Rivers
- Climate Change/Sea Level Rise[1]

[1] Climate Change/Sea Level Rise was added to the list of topics considered per a request made at a public meeting held during the airport planning process. Covering this topic is important now as it will also be a required component of future NEPA documentation.

Environmental categories of greatest concern at the airport are described in greater detail herein. Information was obtained through a combination of field investigations, agency coordination, and review of existing studies that have been conducted either at GON over the past decade (2000-2010) or that have relevance to the Minimum Build Alternative project study area. Studies and documents that were reviewed include:

- *Groton-New London Airport Runway 5-23 Safety Area Improvements: Final Environmental Impact Statement (2004)* – CTDOT State Project 58-280
- *2006 Ornithological Surveys and Habitat Assessments: Groton-New London Airport* by Mark Szantyr (July, 2007)
- *2006 Rare Plant Survey and Plant Community Classification: Groton-New London Airport* by William H. Moorhead III (September, 2007)
- *2006 Soil/Wetland Delineation Report: Groton-New London Airport* (Parsons, July, 2007)
- *Facing Our Future: Infrastructure Adapting to Connecticut's Climate Change* (CTDEEP, March 2009)
- Meeting minutes/session summaries and MS PowerPoint presentations given by various speakers at the Groton Climate Change Adaptation Workshops held during three sessions from December 2009 through June 2010.
- *Coastal Adaptation Plan for the Town of Groton, Connecticut* (2010)
- *Preparing for Climate Change in Groton, Connecticut: A Model Process for Communities in the Northeast (April 2011)*[2]

Digital Geographic Information System (GIS) data maintained by the Connecticut Department of Energy and Environmental Protection (CTDEEP) as well as aerial imagery and assorted hard copy and digital maps were also consulted as part of this environmental review.

The sections that follow provide a summary of future required analyses, potential impacts, and anticipated permits regarding the recommended alternative.

AIR QUALITY

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six air pollutants (i.e., ozone, carbon monoxide, particulates, sulfur dioxide, nitrogen dioxide, and lead). States must identify geographic areas, termed

[2] Available at http://www.groton-ct.gov/depts/plandev/docs/Final%20Report_Groton%20Coastal%20Climate%20Change%20ProjectJP.pdf

"nonattainment" areas, which do not meet the NAAQS. Areas that meet the NAAQS are termed "attainment" areas.

Federal regulations specify that an air quality analysis is not required if the project is located within an attainment area, and at a general aviation airport with less than 180,000 forecast operations. If these criteria are met, it is concluded that the proposed project would not cause significant air quality impacts.

The EPA classifies all of Connecticut as a Moderate Nonattainment Area for 8-hour ozone. New London County is in attainment for all other pollutants monitored by the EPA. Therefore, an air quality analysis would potentially be required during NEPA documentation for the development that occurs within the reserved land areas identified in the Minimum Build Alternative, as increases in emissions due to automobile traffic and/or building exhaust may result.

COASTAL BARRIERS

Bluff Point State Park, located to the east of GON, includes a barrier beach and bluffs and is considered an important undeveloped coastal barrier. Future development at GON in the reserved land areas identified in the Minimum Build Alternative, however, will have no adverse impact to this important coastal barrier resource. Therefore, no further coordination or assessment of impacts to coastal barriers will be required during NEPA or subsequent permitting stages for the Minimum Build Alternative.

COASTAL ZONE MANAGEMENT PROGRAM

The Coastal Zone Management Act (CZMA) and the National Oceanic and Atmospheric Administration (NOAA) provide procedures for ensuring that a proposed action is consistent with approved coastal zone management (CZM) programs. If the coastal zone is located in a state with an approved CZM program, the proposal requires a determination from the State as to the consistency with said program.

The GON airport is located entirely within Connecticut's designated coastal boundary, as defined by section 22a-94 of the Connecticut General Statues (CGS). Therefore, any projects undertaken at the airport are subject to the provisions of the Connecticut Coastal Management Act (CCMA), CGS sections 22a-90 through 22a-112. All activities at or waterward of the high tide line and/or in tidal wetlands would require permits from the CTDEEP Office of Long Island Sound Programs (OLISP) in accordance with CGS sections 22a-361 and 22a-32, respectively.

Coastal resources in the vicinity of GON include:

- Estuarine embayments - south and east
- Tidal wetlands - along the periphery of the airport property

- Freshwater wetlands - north and west
- Beaches – east and southeast
- Shorelands – north and west
- Coastal flood hazard areas – essentially the entire airport
- Nearshore waters – south

GON lies on a coastal peninsula bordered to the east and southeast by the Poquonnock River and Baker Cove to the south and southwest. Both of these bodies of water are estuarine embayments, which are protected coastal bodies of water with an open connection to the sea. These estuarine embayments connect to the Fisher's Island Sound estuary. Baker Cove and the Poquonnock River are both designated as hard clam (*Mercenaria mercenaria*) shellfish concentration areas. These geographic areas support and produce significant concentrations of shellfish that are of recreational and commercial value. The Poquonnock River is designated by the CTDEEP as an "Approved" recreational shellfishing area. Baker Cove, however, is closed to recreational shellfishing. The shellfish beds within Baker Cover are designated by the CTDEEP as "Conditionally Restricted Relay" beds. These beds are leased by commercial shellfisherman, who must first remove or relay their harvest to approved waters for natural cleansing before their harvest can be made available for market consumption.

Coastal tidal marshes line the edges of the airport property, with the southerly Baker Cove/ Poquonnock River area having the largest concentration of tidal wetlands. North of Runway 23, there is an 8-15 foot wide strip of low salt marsh along the Poquonnock River, with an elevation change of 8 to 10 feet from the shoreline to the upland. Large rip-rap is located along much of the Poquonnock River shoreline along the airport property's eastern edge. Located south of Runway 5 is an extensive area where low salt marsh transitions to high salt marsh.

A freshwater wetland comprised of forested and scrub shrub vegetation interspersed with smaller areas of open water is located to the north-northwest of Tower Avenue. This inland wetland, which is described in more detail below, is located in close proximity to the land area reserved under the Minimum Development Alternative for compatible aviation development.

The Minimum Development Alternative could potentially affect coastal resources. In particular, areas of impervious surface can generate freshwater runoff. If not properly managed and treated, this runoff could impact the quality of an adjacent freshwater wetland (described in a subsequent section of this memorandum) or could even impact nearby tidal wetlands depending on the location of the discharge outfall. The alternative will be subject to CAM review by the CTDEEP OLISP.

COMPATIBLE LAND USE

On Airport

The Groton-New London Airport is located in the Town of Groton and abutting the boundary with the City of Groton. The airport is on a peninsula and all of the land on the airport property is occupied for aircraft related uses with the exception of a pocket of undeveloped freshwater wetlands located north-northwest of Tower Avenue. Runways and taxiways occupy the southern tip and eastern half of the airport property with one north/south runway and one east/west runway. These runways and adjacent taxiways abut waterways including Baker Cove and the Poquonnock River. The northwest corner of the airport includes hangars, aircraft parking and related buildings, including maintenance buildings, charter facilities, aircraft sales, safety and rescue training facilities, and a Connecticut National Guard Aviation Maintenance complex.

Off-Airport

The existing Groton-New London Airport is situated on the Connecticut coast at Long Island Sound and is surrounded on the southwest, south, and east by Baker Cove, the Sound, and the Poquonnock River respectively. Land to the east across the river from the airport is the 760 acre Bluff Point Coastal Reserve State Park including the public–access Bushy Point Beach. The park is only accessible on foot. The City of Groton lies immediately to the west and land uses adjacent to the airport in the City are predominantly single-family residential. Other land uses of note in this area include the University of Connecticut at Avery Point on the Avery Point peninsula, the Shennecossett Beach Club and Golf Course, and a mobile home park with approximately 240 homes. Land to the north of the airport is a mix of activities typical of long-established urban and suburban communities. Development abutting the airport to the north and northwest is a business/office park, a rail line, and residential subdivisions further north. Within two miles of the airport are Pfizer Pharmaceuticals and General Dynamics/Electric Boat Defense manufacturing plants. Other uses of note in the vicinity include a town ball field and boat launch to the northeast of the airport, several schools, a daycare, a cemetery and several places of worship.

Development Policies

The airport falls within the planning regions addressed by a) the State *Conservation and Development Policies Plan for Connecticut (2005-2010)* (the C&D Plan) b) the *Regional Plan of Conservation and Development 2007* for the southeastern Connecticut region (SECCOG, October 17, 2007) and c) *Groton 2002 Plan of Conservation and Development* (Groton Planning Commission, February 2002). These plans each articulate a vision, goals, and objectives for future land use and overall development within their respective planning regions. Relevant key elements of these reports are summarized below.[3]

[3] There is also a SECCOG Long Range Regional Transportation Plan FY 2011-2040. That is not a development policies plan per se and are therefore not referenced it in this report. The SECCOG LRTP plan does not call

The C&D Plan contains growth management, economic, environmental quality, and public service infrastructure guidelines and goals for the State of Connecticut. It contains six "growth management principles" intended to better integrate a variety of state planning functions. The overall strategy of the C&D Plan is to reinforce and conserve existing urban areas, to promote appropriate, sustainable development, and to preserve areas of significant environmental value. The Locational Guide Map which accompanies the CD Plan provides a geographical interpretation of the State's conservation and development policies.

According to the C&D Plan's Locational Guide Map, the Groton-New London Airport peninsula falls within a Conservation Area with Neighborhood Conservation areas to the north and west and Preservation Areas to the south and east. Typically, the Conservation Areas are "planned for the long-term management of lands that contribute to the state's need for food, water and other resources and environmental quality by ensuring that any changes in use are compatible with the identified conservation value." The Neighborhood Conservation areas are significantly built-up and well populated areas but without the infrastructure, density, and diverse income characteristics of an urban based regional center. The state strategy for a Neighborhood Conservation Area is to maintain these stable communities and support intensification of development when "supportive of community stability and consistent with the capacity of available urban services". Finally, Preservation Areas are intended to protect significant resource, heritage, recreation, and hazard-prone areas by avoiding structural development, except as directly consistent with the preservation value.

The *Regional Plan of Conservation and Development 2007* for southeastern Connecticut includes a map of proposed future land use based on policies defined in the plan text. The Groton-New London Airport peninsula is identified as an area of "Existing Institutional Uses" and is proposed to remain in that use. It is surrounded by "Existing and Proposed Urban Uses" except for the state park which is categorized as "Existing Recreation and Open Space Uses". The areas of institutional use in the plan include public and private institutional uses that are expected to remain such as "governmental, military, correctional, educational and medical facilities". The plan's urban areas are recommended for "the most intensive residential and/or industrial and commercial development". These areas include the region's urban centers as well as concentrations of intensive development in village and town centers. The plan states that "where feasible, these areas should be looked to for the location of compact, transit accessible, and pedestrian-orientated mixed use". Recreation and open space areas in the plan include existing preserved open space such as Bluff Point Coastal Reserve State Park which should remain as such in the future.

out anything specific to the airport – other than summarizing the work being done for the AMPU, the Wildlife Hazard Mitigation and the EMAS.

The SCCOG *Regional Plan of Conservation and Development 2007* concludes with a set of goals, objectives, and recommended actions. Transportation-related goals, objectives, and recommendations include:

- Goal - Create a balanced regional transportation system that strives to meet the needs of all segments of the population, including tourists, regardless of age, income or disability, and which promotes responsible development within the region's core.

- Objective 3- Regional transportation systems, which are planned and budgeted for within the context of fiscal constraint Recommended Action 10 - Support actions to improve service levels and the use of Groton-New London Airport.

The most recent plan of conservation and development for the Town of Groton is the *Groton 2002 Plan of Conservation and Development*. It is organized around a series of themes including conservation, development, and infrastructure. The transportation system is addressed as part of the infrastructure theme. The overarching goal is to enhance the transportation system. The plan notes that, as of 2002 "the airport is recognized as an underutilized asset and the airline operations there have not been well developed." It also notes that "While the airport continues to provide a valuable service to area residents and businesses, activities at the airport tend to be controversial since about half of its operations involve flight paths over residential areas. Due to the potential impacts (both positive and negative) on local residents and businesses, activities at the airport should be closely monitored." Recommendations relative to the airport include:

- Continue to closely monitor activities at the airport due to the potential impacts (both positive and negative) on local residents and businesses.

- Undertake partnerships with the airport and CTDOT to enhance the economic potential of the airport facilities.

The Minimum Build Alternative was developed as part of a comprehensive planning process coordinated closely with an advisory committee, the town, and the public. The alternative is compatible with all of the development plans and policies identified and described above. The alternative is not expected to directly contribute to fleet mix changes, nor will it affect the number of aircraft operations at the airport. It will not precipitate air traffic changes, or new approaches made possible by new navigational aids, or anything that could potentially affect or exceed existing aircraft noise thresholds experienced in surrounding areas. As described above, the development that could potentially occur under the Minimum Build Alternative in the designated reserved land areas may be driven by future demand for aviation-related business that would exceed areas currently in use or under lease at the airport. The alternative allows for the minimum need-based development of the existing central terminal area. As such, the Minimum Build Alternative

is not anticipated to result in any community disruption, relocations, or induced socioeconomic impacts.

CONSTRUCTION IMPACTS

Construction projects can produce temporary environmental disturbances such as increased noise from construction vehicles and equipment, air quality impacts from dust and excessive idling of equipment and vehicles, and water quality impacts from increased sedimentation due to erosion of disturbed surfaces. Local traffic patterns and vehicle mix in the vicinity of a construction site can also be affected by detours and designated truck haul routes. Temporary utility impacts can occur as a consequence of service disruptions due to construction. These impacts can all be mitigated through careful planning and consideration, as well as through quality-focused construction supervision.

Limiting construction activities to normal daytime work hours will eliminate nighttime noise. Enforcing three-minute idling rules and using dust covers on haul trucks will help to reduce air emissions at the construction site and along haul routes.

Construction specifications for any development at GON would include Best Management Practices (BMPs) for control of erosion, sedimentation, and stormwater runoff. The airport currently operates under an existing CTDEEP Stormwater Discharge Permit and Stormwater Pollution Prevention Plan (SWPPP). However, any future development(s) at the airport would require application to the CTDEEP for a General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities associated with that development, including preparation of a SWPPP for the construction activity. The SWPPP would identify measures to avoid or minimize impacts to surface waters and groundwater at the site both during and after construction activities. The specific measures included in the plan would be determined during the design phase, and could consist of the implementation of infiltration swales, vegetated buffer strips, vegetated open channels, and/or a piped stormwater collection and conveyance system. Also, if any stormwater discharges are to be located within 500 feet of a tidal wetland, the developer is required to retain the first one inch of stormwater runoff prior to discharge. The overall goal of the plan is to minimize runoff, especially to the nearby freshwater and tidal wetlands, and to replicate pre-construction hydrology. Temporarily disturbed areas would be re-seeded with a seed mix deemed appropriate for the airport, and stabilized following construction. Post construction controls would be inspected and maintained on a regular basis.

With the standard safeguards identified above, construction impacts associated with the Minimum Build Alternative could be effectively managed and minimized.

AIRCRAFT NOISE

A noise analysis was performed for this project using Integrated Noise Model (INM) version 7.0c. The software was developed for the FAA and is approved for use to estimate noise exposure around airports.

INM is a computer model that evaluates aircraft noise impacts in the vicinity of airports. It is developed based on the algorithm and framework from SAE AIR 1845 standard, which used Noise-Power-Distance (NPD) data to estimate noise accounting for specific operation mode, thrust setting, and source-receiver geometry, acoustic directivity and other environmental factors. The INM can output either noise contours for an area or noise level at pre-selected locations. The noise output can be exposure-based, maximum-level-based, or time-based. In the United States, INM is preferred model typically used for FAR Part 150 noise compatibility planning and for FAA Order 1050 environmental assessments and environmental impact statements. The INM has many analytical uses, however for this study only assessing changes in noise impact resulting from new traffic demand and fleet mix were analyzed.

Input for this study included the following:

- Layout of the airport (runway length, runway ends and runway end elevations)
- Type of aircraft using the facility (fleet-mix)
- Number of operations, both day time and night time[4]
- Flight corridors used by the aircraft for take-offs and landings, including touch-and-go operations.

The output results in noise contours, which define areas of similar noise exposure. These contours are then overlaid on a color orthorectified photo of the airport and immediate surrounding community, which depicts areas impacted by aircraft noise.

There are several different measurements used to define noise exposure. The FAA has approved the use of the day-night average sound level (abbreviated Ldn) for noise compatibility modeling around airports. Ldn represents the average sound level in A-weighted decibels (sound exposure adjusted for the response of human hearing) for a 24-hour period. The Ldn metric also approximates the response to nighttime noises by adding 10 decibels to all noise events (aircraft operations) between 10 pm and 5:59 am.

The FAA also provides guidance for recommended land uses within specific noise exposure areas (areas within defined Ldn contours). Below 65 Ldn, all land uses are considered compatible. Above 65 Ldn, the compatibility of land uses depends on a variety of factors, including the Ldn at a specific location, type of land use, construction standards such as

[4] For INM, nighttime is between 10 pm and 7 am.

sound insulation, manmade or nature noise barriers, land use controls such as zoning or easements, and ambient noise levels.

While local communities generally do not have authority to regulate the type or time of aircraft operations at the airport without complex studies and analysis, the FAA guidelines[5] provide tools for local municipalities to develop compatible land uses surrounding airports. Because the guidelines are fairly extensive they are not included in this document, but are available over the Internet through the Government Printing Office's website.[6]

The distribution of the noise pattern calculated by INM is a function of the number of aircraft operations during the evaluation period, the types of aircraft flown, the time of day of the operation, aircraft flight tracks, how frequently each runway is used for operations, and aircraft operational procedures. Variations of any of these over an extended period of time could result in discernible changes to the annual noise pattern.

In order to calculate noise contours for the future 2030 conditions, the average numbers of daily arrivals and departures by specific aircraft types were prepared for input into the INM. The fleet mix and number of annual operations for future conditions were taken from the forecast of future conditions analysis completed earlier in this study.

The noise analysis included 50,424 aircraft operations in the 2030 calendar year. Of these approximately 2%, or 1024 were allocated to night time operations. When divided by 365 days, the average annual daytime operations equal 138 arrivals and departures. Of these 2.8 operations occur, on average between the hours of 10 pm and 5:59 am. Table 7.1 summarizes the future aircraft operations by aircraft category.

Table 7.1. Forecasted Day/Night Operations by Fleet-Mix in Year 2030

Aircraft Category	Day Time	Nighttime	Total	Percent
General Aviation Single Engine Prop	25,000	114	25,114	50%
General Aviation Multi Engine Prop	5,200	50	5,250	10%
General Aviation Jet	17,200	800	18,000	36%
Military	500	20	520	1%
Helicopter	1,500	40	1,540	3%
Total	**49,400**	**1,024**	**50,424**	**100%**

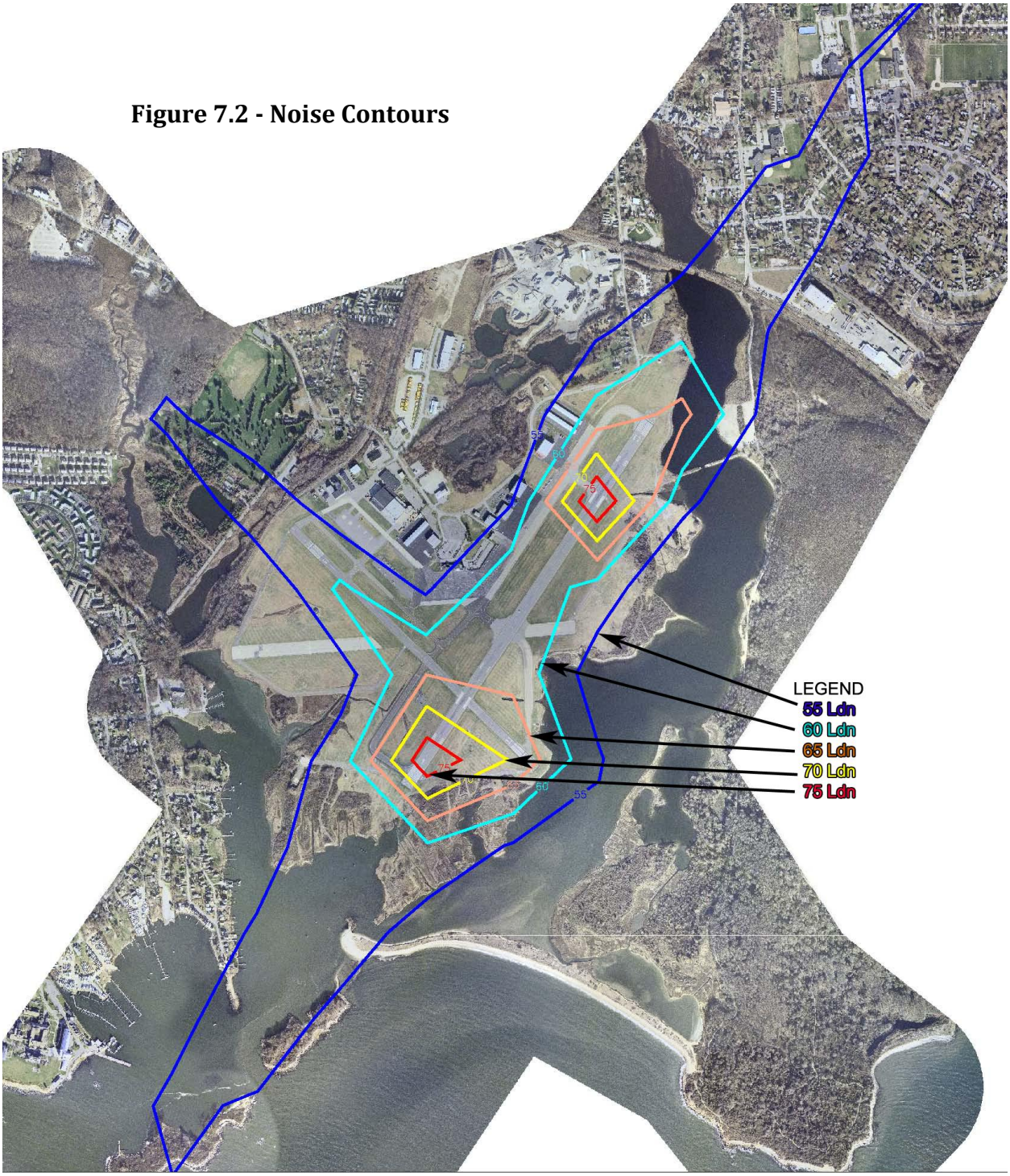
[5] 14 CFR Part 150, Airport Noise Compatibility Planning

[6] http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title14/14cfr150_main_02.tpl

The number of forecasted operations was taken from Chapter 3, Forecasts of Aviation Activity (see Table 3.10, page 73). Flight corridors developed earlier in the master plan process (see *Aircraft Arrival and Departure Routes*, page 26).

The Land-Use Plan shown in Figure 7.2 (next page) presents the 55 through 75 Ldn contours overlaid on an orthorectified aerial photograph of the airport and immediate surrounding community. An analysis of incompatible uses was performed by identifying land areas within the various noise exposure areas. The 65 Ldn and higher contours all rest well within the airport boundary. As noted in Figure 7.2, only the 55 and 60 Ldn contours extend off airport.

Figure 7.2 - Noise Contours



The 60 Ldn exposure area extends off the approach end of Runway 23 a short distance, near Karen Avenue, but exclusively over undeveloped land. The 55 Ldn extends:

- Beyond the approach end of Runway 23 across the Poquonnock River, the railroad tracks and into a residential area referred to as Midway Oval Park.
- Off the approach end of Runway 15, across Thomas Road and over the Birch Plain Golf Course.
- Beyond the approach end of Runway 5 over the tip of Jupiter Point Road, and parts of uninhabited Bushy Point, and Pine Island.

There is an aircraft Noise Compatibility Program in effect at the airport. This Program was developed by the Connecticut Department of Transportation and the Groton-New London Airport Advisory Committee in accordance with the provisions and procedures of Federal Aviation Regulation - Part 150. The procedures listed are mandatory, consistent with the safe operation of aircraft, and part of the Noise Compatibility Program for the Airport. The mandatory flight procedures include the following:

- Departing Runway 5 - Turn left heading 020º until clear of the Groton reservoir or until leaving 1000' MSL, before proceeding on course.
- Departing Runway 23 - turn left heading 210° until clear of Pine Island or until leaving 1000' MSL, before proceeding on course.
- Departing Runway 33 - Maintain runway heading until clear of the Westside School or leaving 1000' MSL. Landing Runway 5 - Left traffic, extend downwind to avoid Avery Point.
- Touch-and-Go Operations – Restrictions
    - Aircraft operators are encouraged to refrain from touch-and-go operations between the hours of sunset and 8:00 a.m.
    - No touch-and-go operations are permitted by any aircraft operator between the hours of 10:00 p.m. and 6:00 a.m.
- Preferential Runway Use Program - Runway 23 is designated Calm Wind runway and is to be used under as many calm and light wind conditions as possible to minimize flight over noise sensitive areas north of the Airport.

SOCIAL AND INDUCED SOCIOECONOMIC IMPACTS

Social and induced socioeconomic impacts are typically defined by disruptions to surrounding communities, such as shifts in patterns of population movement and growth, changes in public service demands, loss of tax revenue, and changes in employment and

economic activity stemming from airport development. These impacts may result from the closure of roads, increased traffic congestion, acquisition of business districts or neighborhoods, and/or by disproportionately affecting low income or minority populations.

Development anticipated under the Minimum Build Alternative at GON does not have the potential for these types of broad impacts. There will be no impacts to housing that would result in the relocation of residents; no impacts or relocation of businesses that would create severe economic hardship on the community; no substantial loss to the community tax base; and only minor disruption of local traffic along Tower Avenue is anticipated during project construction. Past FAA studies have identified that social and induced socioeconomic impacts are not normally significant unless substantial impacts are anticipated in other categories (e.g., noise, land use, property acquisition), and this would not be the case with the Minimum Build Alternative at GON.

WATER QUALITY

Surface Water Resources

The airport property is located within the Southeast Coastal Drainage Basin. According to CTDEEP Surface Water Quality Standards (February 25, 2011), the Poquonnock River, which forms the northeast boundary of GON is classified as a Class SA surface water resource. Class SA surface waters are saline and are known or presumed to meet specific defined water quality criteria for Class SA waters that support several designated uses, including: Habitat for marine fish, other aquatic life and wildlife; shellfish harvesting for direct human consumption; recreation; industrial water supply, and navigation. Discharges to Class SA waters may be permitted by the Commissioner of CTDEEP from public and private drinking water treatment systems; and from dredging activities and dredge material dewatering operations, including the discharge of dredged or fill materials and clean water discharges.[7] Other discharges to Class SA waters may be authorized by the Commissioner of CTDEEP provided the Commissioner finds such discharge to be of short duration and is necessary to remediate potential surface or groundwater pollution. Any such discharge shall be treated or controlled to a level which in the judgment of the Commissioner; protects aquatic life and public health. These other discharges may include the discharge of treated domestic sewage so long as the domestic sewage discharge meets or qualifies for one of five specific criteria defined for Class A and SA surface waters discharges defined in CTDEEP surface water standards.

The southerly adjoining Baker Cove has a state water quality classification of Class SB. Designated used for Class SB surface waters are similar to Class SA designated uses with the exception that shellfish cannot be harvested for direct human consumption from waters designated as Class SB. Commercial shellfish harvesting; however, can occur in

[7] This information was taken verbatim from the CTDEEP water quality standards

Class SB waters. The designated uses are defined for water quality criteria that are slightly less stringent than the criteria defined for Class A and SA waters. Discharges to Class SB surface waters include all discharges allowed for Class SA waters described above as well as cooling water discharges and discharges from municipal and industrial wastewater treatment systems. Other discharges subject to the provisions of CGS Section 22a-430 may also be allowed to Class SB surface waters.

Nearby freshwaters, including the wetland located northwest of Tower Avenue, are designated as Class A surface water resources. Designated uses for Class A waters are based on established criteria defined in the February 2011 CTDEEP Surface Water Quality manual and include the following: habitat for fish and other aquatic life and wildlife; potential drinking water supplies; recreation; navigation; and water supply for industry and agriculture. Discharges to Class A waters are identical to those defined above for Class SA waters.

There are several known active or recently active wastewater discharges into Baker Cove. These discharges include: cooling water from Electric Boat Corporation's Research and Development Annex on Poquonnock Road (into Birch Plain Creek); cooling water from Arwood Corporation; and Groton-Trumbull sewage treatment plant. The sole discharge into the Poquonnock River is backwash from the Groton Water Department's filtration facilities located upstream from the airport.

Groundwater Resources

The entire airport property is underlain by groundwater that is designated as Class GB according to the CTDEEP Groundwater Quality Standards (2011). Class GB groundwater is found in areas that have a long history of urban or industrial activity. These areas are serviced by public water supply systems. The CTDEEP assumes the underlying groundwater to be degraded due to a variety of pollution sources; as such, no specific groundwater quality criteria apply. Designated uses of Class GB groundwater include: Industrial waters and cooling waters; and baseflow for hydraulically connected surface water bodies. Groundwater with a Class B designation is presumed not suitable for human consumption without treatment.

Potential Water Quality Impacts

Because proposed development activities associated with the Minimum Build Alternative are in close proximity to a Class A surface water resource (the wetland area located northwest of Tower Avenue), any construction activity to implement the Minimum Build Alternative has a moderate potential to impact the water quality of that wetland system. Therefore, project designs will be developed according to the guidelines contained in the CTDEEP *Stormwater Quality Manual* (2004) as well as with the *2002 Connecticut Guidelines for Sediment and Erosion Control*. BMPs for control of erosion, sedimentation, and stormwater runoff would be incorporated into project construction specifications. Additionally, because construction of the Minimum Build Alternative is likely to disturb

more than one acre of land area, a *General Permit for Stormwater and Dewatering Wastewaters from Construction Activities* will be required by the CTDEEP and an associated Stormwater Pollution Prevention Plan (SWPPP) would be required. The SWPPP would include a description of the erosion and sedimentation controls to be used on the site, the management of dewatering wastewaters, and will also describe all measures that would be installed to ensure post construction stormwater management as new impervious surfaces are likely to be created with the Minimum Build Alternative which could potentially be a source of contaminants. The plan would also address the disposal of waste at the site, and described practices to be followed to minimize off-site vehicle tracking of sediments and the generation of dust.

USDOT SECTION 4(F)

The US Department of Transportation Act of 1966 prevents transportation projects from developing or taking publicly owned land from public parks, recreational areas, designated wildlife or waterfowl refuges, or historic sites of national, State, or local significance unless there are no feasible alternatives, and planning to minimize harm and mitigation measures have been incorporated.

Although there are several 4(f) properties in the vicinity of the airport, such as Bluff Point State Park located east of the Poquonnock River, the Minimum Build Alternative will have no direct impacts to these protected resources. Additionally, the development associated with the Minimum Build Alternative is also not anticipated to result in any constructive use of Section 4(f) resources.

CULTURAL RESOURCES

A review of the 2010 National Register of Historic Places (NRHP) revealed that there are no listed historic properties or districts located along either side of Tower Avenue near the main entrance to GON. These areas are identified in the Minimum Build Alternative for future aviation or compatible aviation development. The area east of Tower Avenue is partially developed as a surface parking lot for the airport terminal and therefore is disturbed. The remaining land area adjacent to the surface parking lot is mowed/maintained lawn. The area northwest of Tower Avenue is comprised of a mowed/maintained field and freshwater wetland.

Although previous archaeological studies conducted for the Groton-New London Airport Runway Safety Area EIS determined that there are prehistoric archaeological sites on the airside portion of the airport property near the ends of Runway 5-23, no archaeological sites have been identified in the two "reserved" development areas located along Tower Avenue. Despite no listed or eligible cultural resources in these areas, further consultation with the Connecticut State Historic Preservation Office (SHPO) and an on-site archaeological survey of the Minimum Build Alternative land areas may be required once a development concept for these locations is established. The survey would aide in the

determination of whether sensitive cultural resources are present and whether or not there is a potential for impacts. However, at this stage of airport planning, there appears to be no impact to cultural resources from the Minimum Build Alternative.

BIOTIC COMMUNITIES

As mentioned at the outset of this memorandum, the airport has been the subject of extensive environmental investigations during the past decade. These investigations were performed to 1) support the Runway Safety Area EIS, which culminated with the recommendation to install an Engineered Materials Arresting System (EMAS) at each end of Runway 5-23, and 2) to support permit documentation required to implement EMAS. EMAS was installed on the Runway 5 and 23 ends. These studies helped characterize the variety of biotic communities found on the airport property.

The perimeter of the airport property is comprised of tidal marshes, grasslands and scrub-shrub areas. The interior of the airport property consists of paved taxiways and runways, with maintained grass throughout. The two areas on either side of Tower Avenue that have been identified for possible future aviation or compatible aviation development under the Minimum Build Alternative include the following biotic communities:

- **Maintained Lawn** – regularly mowed and maintained grass
- **Maintained Field** – open, successional field that is periodically mowed and maintained
- **Forested Wetland** – treed inland wetland area dominated by red maples
- **Non-forested Inland Wetland** – shrub and emergent inland wetland area dominated by dogwood and herbaceous species
- **Inland Open Water** – non-tidal fresh water

Development of the land areas identified in the Minimum Build Alternative would primarily impact mowed and maintained lawns and fields. Wetlands are regulated resources and are not likely to be directly impacted by development.

THREATENED AND ENDANGERED SPECIES

Coordination with the United States Fish and Wildlife Service (USFWS) and the CTDEEP Natural Diversity Database (NDDB) to identify federal and state listed threatened and endangered species, state species of special concern, and critical habitats on GON property occurred on a fairly regular basis over the past decade. Coordination was conducted as part of NEPA planning and documentation efforts and permitting activities associated with

Runway Safety Area (RSA) improvements at the airport. Agency responses to this ongoing coordination effort identified the need for detailed plant and bird surveys at the airport.

From May 9, 2006 through November 7, 2006, a detailed survey of state and federally listed plant species was orchestrated by Parsons Corporation. The survey culminated in a September 2007 report by Parsons entitled, "2006 Rare Plant Survey and Plant Community Classification" A total of 54 plant species were targeted by the survey. A total of seven State-listed endangered plant species and three Special Concern plants were found to exist on the airport property. No federally listed threatened or endangered plant species were identified on GON property.

With respect to the Minimum Build Alternative, no state endangered or special concern plant species were identified in the land area to the east of Tower Avenue that is reserved for future aviation development. However, two state listed plants were found to occur on land northwest of Tower Avenue that is reserved for compatible aviation development. The plants, which include the state endangered Nuttall's milkwort (*Polygala nuttallii*), and Needlegrass (*Aristida longespica*), a state special concern plant, were found along the periphery of the large freshwater wetland system. Any development planned at this location has the potential to impact these species. Therefore, coordination will be required with the CTDEEP NDDB during subsequent NEPA and project permitting stages.

Parsons Corporation also managed a comprehensive bird survey that was performed during 2006 to establish a baseline avifaunal profile at the airport. The results of the survey are documented in a report, entitled, "*2006 Ornithological Surveys and Habitat Assessments*" for the GON property, which was completed in July 2007. The survey involved an inventory of nesting bird species and species listed by the state as endangered, threatened and special concern. The survey recorded a total of 98 species of birds and 27 species were determined to be nesting on the airport property. Of the 98 bird species identified, 19 are listed by the CTDEEP; including six endangered, three threatened, and 10 species of special concern. Of these listed birds, four are suspected of breeding at the airport. The report does not identify any nesting areas of state endangered, rare, or special concern bird species in the vicinity of Tower Avenue on the two land areas reserved for future aviation development under the Minimum Build Alternative. The report concludes that if any construction work were to occur at GON, it should be conducted during the non-breeding season.

Due to the abundance of state listed bird species found on GON property, any development planned at the airport may have the potential to impact these species. Therefore, coordination will be required with the CTDEEP NDDB during subsequent NEPA and project permitting stages. Any areas proposed to be developed will be thoroughly investigated prior to construction to ensure that no breeding is occurring in the area. Time of year restrictions on construction activities will be established as necessary to ensure no adverse impact.

SECONDARY AND CUMULATIVE IMPACTS

Secondary impacts occur when one project fosters, encourages, and/or enables another project with environmental impacts. Cumulative impacts consider past, present, and reasonably foreseeable actions, based on the fact that environmental impacts can accumulate over time. Therefore, the assessment of secondary and cumulative impacts requires consideration of both spatial and temporary factors and the overall sensitivity of natural and community resources.

Major development proposals often involve the potential for induced or secondary impacts on the surrounding environment and community. Examples include: increased public service demands; shifts in population patterns, movement, and growth; and changes in business and economic activity. These changes can often result in induced impacts to natural and community resources. The recommended Minimum Build Alternative at GON is not considered to be a major development proposal. It will not change the general character of the existing airport nor will it change the character of the community within which it is located. Its overall potential to directly impact natural and community resources is considered to be minimal and manageable. Nevertheless, once a development proposal is advanced at the airport that is in keeping with the recommended Minimum Build Alternative, there will be a need to assess, in more detail as part of NEPA compliance process, the potential likelihood for the action to generate secondary and cumulative impacts. However, these impacts are anticipated to be minimal.

LIGHT EMISSIONS

The Minimum Build Alternative involves setting aside land areas for potential future development should economic conditions at the airport become ripe for development. The areas are set aside for "as yet to be defined" landside aviation development and compatible aviation development that is not associated with the airfield or runway improvements. Such development is likely to include hangars, storage space, parking, and other landside amenities that are accessible to the general public. As such, the Minimum Build Alternative will not include airside lighting such as runway lighting or any other elaborate lighting systems that would include blinking or flashing lights or high intensity lights that would be considered intrusive or offensive to area residents. Instead, energy efficient fixtures would be used for parking area and facility illumination at the proposed development sites. The lights would be properly shielded to prevent light scatter, and would be directed and/or focused only on the area to be illuminated. All lighting will be "Dark Sky Compliant".

Compared to background levels associated existing air navigation infrastructure (NAVAIDS) at GON, light emission impacts from the Minimum Build Alternative are unlikely to have an adverse impact on human activity or the use or characteristics of adjacent properties.

NATURAL RESOURCES AND ENERGY SUPPLY

The Minimum Build Alternative does not include specific development concepts or plans but instead involves setting aside land areas for potential future development should economic conditions improve and airport use/activities increase. The areas set aside for "as yet to be defined" aviation development and compatible aviation development are located on either side of Tower Avenue. Development at these locations would potentially include hangars, other equipment and materials storage facilities, parking, and amenities that are accessible to the general public. The intensity of development is expected to be low and will proceed gradually over the 20-year planning period covered by this update to the GON Master Plan. Additionally, principals of environmental design, sustainability, and energy conservation are now being required on federally funded projects, in keeping with Executive Order 13123, *Greening the Government through Efficient Energy Management*. Thus, innovative measures that reduce greenhouse gas emissions and air pollution; minimize the generation of wastes; conserve water resources; and promote the use of renewable energy products are being incorporated into project and facility designs.

Although the specific types of landside development at these reserved sites remains to be defined, the developments, when incorporating the measures described above, are anticipated to have low to moderate energy requirements and therefore would not have a measurable effect on local supplies of energy or natural resources.

FARMLANDS

The Natural Resources Conservation Service (NRCS) within the United States Department of Agriculture (USDA) has established guidelines under the Farmland Protection Policy Act (FPPA) for federal activities the involve directly undertaking, financing, or approving a project that would convert farmland soils. The guidelines recognize that the quality of farmland varies based on soil conditions, and places higher value on soils with high productivity potential. To preserve these highly productive soils, the NRCS classifies soil types as prime and statewide important. The NRCS requires that soils in these categories be given proper consideration before they are converted to non-farming uses by federal programs.

Although there are no active farms located on, or adjacent to the land areas set aside for future aviation development and compatible aviation development as proposed in the Minimum Build Alternative, a portion of these land areas (those areas that are not currently paved surface parking lots) do include soils identified on NRCS mapping as prime farmland soils. Proposed future development associated with the Minimum Build Alternative would therefore affect these soils. Due to their location within the airport property boundary; however, it is highly unlikely that these soils would ever be developed as active farmland.

WETLANDS

Wetlands on the airport property were delineated and described in a report entitled "*2006 Soil/Wetland Delineation Report*" prepared by Parsons Corporation in July 2007. The report identified both inland wetlands and tidal wetlands on the airport property. There is one inland wetland that is located northwest of Tower Avenue and proximate to the land area identified in the Minimum Build Alternative as "reserved" for future aviation compatible development. This wetland is the only wetland on or adjacent to the airport property that could potentially be impacted by development occurring under the Minimum Build Alternative. The wetland is described by Parsons as a "Palustrine Forested/Shrub-Scrub/Emergent/Aquatic/Open Water Wetland that consists of an excavated pond/wetland separated into three areas by an access road and associated berms. The northernmost open water pond connects to offsite ponds associated with an active quarry. The other areas are isolated except for subsurface hydrologic connection." The wetland, which has a high degree of interspersion of different wetland vegetative types, has several principal functions; including wildlife habitat, production export, fish habitat, and potential threatened/endangered species habitat.[8]

The exact type of compatible aviation development that could occur next to this wetland has not yet been defined under the Minimum Build Alternative. Any improvements planned for this area would be designed to avoid direct wetland impacts to the greatest extent possible. Potential indirect impacts to this wetland could occur from sediment inputs during construction or if stormwater runoff from any new impervious areas is discharged into the wetland. Secondary impacts could also occur at this wetland from as yet to be defined adjacent development(s). Overall, potential impacts to this wetland will need to be assessed further in NEPA once a conceptual design plan for the site is developed.

FLOODPLAINS

Floodplain resources are governed and regulated by Executive Order 11988. Federal agencies must take steps to avoid, to the greatest extent possible, both long term and short term impacts to floodplains. In addition, they should avoid supporting actions that directly or indirectly promote development within FEMA designated floodplains or floodways whenever there is another practicable alternative available.

The Federal Emergency Management Agency (FEMA) publishes Flood Insurance Rate Maps (FIRMs) that depict 100-year and 500-year floodplains in many areas throughout the country. A 100-year floodplain is an area that has a 1% chance of being flooded in any given year whereas a 500-year floodplain is an area that has a 0.2% chance of being flooded in a given year. A review of the most recent FIRM data (July 18, 2011) for the study area indicates that most of the airport lies within the 100-year coastal floodplain associated

[8] The information included here was taken directly from a report by Parsons Corp (referenced in the paragraph). Since an F&V assessment of this wetland was part of the scope for the AMPU, we cannot provide any more information as to other functions or values that are occurring at this wetland.

with Long Island Sound. The areas reserved for development under the Minimum Build Alternative fall mostly within the FEMA 100-year floodplain with 100-year base flood elevations determined to be 9 or 10 feet. Interviews with airport personnel conducted as part of the Runway Safety Area EIS determined that the airport is subjected to occasional flooding events during hurricanes and major nor'easters. During these events, floodwaters have extended up onto the safety areas surrounding runway end and taxiway edges. It was also revealed that during heavy rainfall events, particularly at high tide, some localized flooding occurs on some airplane parking ramps. This localized flooding also occurs along roadways leading to the airport access road (Tower Avenue) and at the roadway entrance to the terminal building. This is in the general location of the areas reserved for future development under the Minimum Build Alternative. Therefore, any development in these areas would have the potential to impact floodplain resources and could potentially effect localized flooding conditions and flood elevations. The development would need to comply with Section 25-68h-2 through 25-68h-3 of the Regulations of Connecticut State Agencies. [9]

SOLID WASTE

The proposed land areas on either side of Tower Avenue that are "reserved" for potential future development under the Minimum Build Alternative are currently being used either as surface parking for the GON terminal building or are regularly mowed and maintained grassy areas or fields. An inland wetland also occupies a portion of the land area northwest of Tower Avenue as described elsewhere in this memorandum. There are no obvious signs of, or known hazardous waste areas, underground storage tanks, or other potential sources of contamination at these locations. However, an investigation of files maintained by the USEPA and CTDEEP, including Resource Conservation and Recovery Act (RCRA) files, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) files, leaking underground storage tank (LUST) files, and spill files among others should be conducted as an important confirmation step during the NEPA environmental process and subsequent permitting phases associated with any development of these sites.

Because a specific development proposal has not been identified for these two "reserved" land areas, the potential for solid waste generation, including amounts generated and methods of collection and disposal cannot be determined at this stage of the airport planning process. These issues will need to be considered and addressed once conceptual design plans are established. Regardless, any development will result in an increased output of solid waste over the existing condition. Additionally, any solid waste generated during construction will be handled and disposed of properly.

[9] Any future development recommends by or independent of this AMPU would need to comply to the referenced CT State Agency Regulations.

WILD AND SCENIC RIVERS

There are no state or federally designated wild and scenic rivers within the airport vicinity. As such, the Minimum Build Alternative will have no impacts to this resource.

CLIMATE CHANGE/SEA LEVEL RISE

The issue of climate change and its potential effect on sea level rise and storm frequency has been of increasing concern over the past few decades. The continued release of greenhouse gases to the atmosphere at unprecedented rates has contributed to a very gradual upward trend in global temperatures. Scientists have predicted that this global warming trend will continue indefinitely into the future unless we significantly curb our dependency on fossil fuels and reduce greenhouse gas emissions.

The effects of global warming are predicted to include a reduction of the polar ice caps leading to an increase in sea level rise, as well as a potential increase in the frequency and intensity of coastal storm events. A wide range of predictions have been put forth as to the rates and timeframe for sea level rise but there is overall agreement that sea level rise is inevitable. As such, coastal communities and entities with significant investments in, or oversight and administration of, coastal infrastructure have begun to initiate various levels of adaptation planning. The City and Town of Groton and GON are no exception, as they recently took part in a series of three climate change adaptation workshops held from December 2009 through June 2010. Due to the coastal location of GON, sea level rise could potentially affect operations at the airport in the future. The present AMPU only covers a 20-year planning horizon. Its recommended alternative, the Minimum Build Alternative, suggests "reserving" specific land areas for future aviation development should economic conditions improve and airport use/operations increase, thereby creating a need for such development. It does not recommend a full build-out of the airport property or significant outlay of expenditures at this point in time. As time passes and the need for another update to the airport master plan arrives, the issue of adaptation planning to address climate change and sea level rise will take greater precedence so that informed decisions regarding airport needs and expenditures can be made. Hopefully, in the interim, updated climate change data will be gathered and additional climate change studies will occur which will further direct the planning process not only at GON, but by coastal communities and coastal infrastructure managers worldwide. The Airport sponsor will take an active role in future planning efforts and climate change studies with local and state entities.

With respect to the Minimum Build Alternative's potential to contribute to greenhouse gas emissions, development concepts have yet to be advanced for these "reserved" land areas. As development concepts arise, GON will advocate for the inclusion of measures to reduce greenhouse gas emissions as well as other innovative and environmentally friendly design features as applicable.